

Notice of Allowability	Application No.	Applicant(s)	
	10/797,136	INOMATA ET AL.	
	Examiner	Art Unit	
	William J. Klimowicz	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Reply filed November 2, 2004.
2. ☒ The allowed claim(s) is/are 25-29, renumbered as claims 1-5, respectively.
3. ☒ The drawings filed on 11 March 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/443,830.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>5 sheets</u> 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>2-25-05</u>. 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____. |
|---|---|

Election/Restriction

The Applicants alleged in a reply filed November 2, 2004, that:

[t]he relationship between Claims 20-24 and Claims 25-29 is not a species relationship, but is a combination-subcombination relationship under M.P.E.P. § 806.05(h) in which Claims 20-24 are the subcombination and Claims 25-29 are the combination. In order to establish distinctness between the claims in a combination-subcombination relationship, two-way distinctness must be demonstrated. Since two-way distinctness has not been demonstrated between Claims 20-24 and Claims 25-29, it is submitted that the Patent and Trademark Office has failed to meet the burden necessary in order to sustain the election requirement.

Further, if no prior art is found over which the claims of specie II, Claims 25-29, may be rejected, it is requested that the Examiner extend the search to the non-elected specie I.

Accordingly, for the reasons presented above, it is submitted that the Patent and Trademark Office has failed to meet the burden necessary to sustain the Election of Species Requirement. Withdrawal of the Election of Species Requirement is respectfully requested.

The Examiner has found this argument to be in error. More concretely, the Examiner points out that Species I, Figure 16 which corresponds to claims 20-24, includes a recitation of, *inter alia*, “a stack of a soft magnetic layer and a fourth magnetic layer...” See Claim 20, lines 4-5. This limitation is *exclusive* to the embodiment of Species I (Figure 16) and is not in any way associated with the embodiment of Figure 17 (elected Species II, which corresponds to claims 25-29). As such, claim 20 is not a generic claim that encompasses both Species I and II, as alleged by the Applicants. Moreover still, Species I and II are not related as a “combination-subcombination relationship” as argued by the Applicants, but in fact, are two, mutually exclusive embodiments, with Species I (Figure 16) reading on Claims 20-24 and Species II (Figure 17), reading on Claims 25-29. See also Applicants’ preliminary amendment to the original claims, filed on March 11, 2004 (page 6).

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As such, the Examiner called the Applicants' representative to cancel non-elected Species I (Figure 16) corresponding to claims 20-24. The Applicants agreed to cancel the non-elected claims 20-24.

EXAMINER'S AMENDMENT

An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Harris Pitlick on February 25, 2005.

The application has been amended as follows:

(I) Claims 20-24 have been cancelled in their entirety.

Reasons for Allowance

The following is an Examiner's statement of reasons for allowance:

The prior art of record fails to fairly, teach, show or suggest, by either anticipating or rendering obvious, the invention as set forth in the claims of the instant application.

Furthermore, a search made does not detect the combined claimed elements as set forth in the pending claims. Additionally, the reasons for allowance of the claims over the prior art of record is believed to be readily clear, self evident and apparent from the claim language set forth in sole independent claim 25, when compared and contrasted with the prior art.

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More particularly, the instant invention (as set forth in independent claim 25) provides for a magnetic memory device including a memory cell. The cell includes a ferromagnetic double tunnel junction having a stacked structure of a first ferromagnetic layer including two ferromagnetic films antiferromagnetically coupled through a non-magnetic film, a first tunnel insulator, a second ferromagnetic layer, a first nonmagnetic layer, a third ferromagnetic layer, a second nonmagnetic layer, a fourth ferromagnetic layer, a second tunnel insulator, and a fifth ferromagnetic layer. The fifth ferromagnetic layer comprises two ferromagnetic films antiferromagnetically coupled through a non-magnetic film, which are stacked in the order recited. The second and third ferromagnetic layers are antiferromagnetically coupled through a first non-magnetic layer. The third and fourth ferromagnetic layers are antiferromagnetically coupled through a second non-magnetic layer. The magnetization of the ferromagnetic film of the first ferromagnetic layer in a region in contact with the first tunnel insulator and magnetization of the ferromagnetic film of the fifth ferromagnetic layer in a region in contact with the second tunnel insulator are pinned in the same direction. A magnetization direction of the second and the fourth ferromagnetic layers and a magnetization direction of the first and the fifth ferromagnetic layers are substantially parallel or anti-parallel to each other when no current magnetic field is applied. A bit line is provided extending to a first direction, and a word line is provided extending to a second direction crossing the first direction.

The closest prior art includes Gill (US 6,259,586 B1) who discloses a magnetic tunnel junction sensor with an anti-parallel coupled free layer.

Gill (US 6,259,586 B1), however, fails to teach, show or suggest a double tunnel junction, which includes a stacked structure of a first ferromagnetic layer including two

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ferromagnetic films antiferromagnetically coupled through a non-magnetic film, a fifth ferromagnetic layer, comprising two ferromagnetic films antiferromagnetically coupled through a non-magnetic film, and a fourth ferromagnetic layer, wherein a third and fourth ferromagnetic layers are antiferromagnetically coupled through a second non-magnetic layer, whereby the magnetization of the ferromagnetic film of the first ferromagnetic layer in a region in contact with a first tunnel insulator and magnetization of the ferromagnetic film of the fifth ferromagnetic layer in a region in contact with the second tunnel insulator are pinned in the same direction.

Additionally, Gill (US 6,259,586 B1) does not disclose wherein a magnetization direction of the second and the fourth ferromagnetic layers and a magnetization direction of the first and the fifth ferromagnetic layers are substantially parallel or anti-parallel to each other when no current magnetic field is applied.

Thus, Gill (US 6,259,586 B1) does not disclose the invention as set forth in the manner, function and relationship relative to other claimed structure as prescribed by the independent claim 25.

Additionally, Gill (US 6,259,586 B1) does not provide, alone or in combination with the art of record or general knowledge within the art, any suggestion or teaching for the invention as set forth in the independent claim 25.

Conclusion

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

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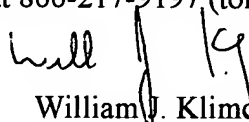
fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Klimowicz whose telephone number is (703) 305-3452. The examiner can normally be reached on Monday-Thursday (6:30AM-5:00PM).

On or about March 7, 2005, the Examiner will have moved to the new Patent Office location located in Alexandria, Virginia. The new phone number the Examiner can be reached at will be (571) 272-7577.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


William J. Klimowicz
Primary Examiner
Art Unit 2652

WJK